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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,875	10/15/2001	Christopher D. Eckhoff	75622.P0048	3782

7590 05/27/2008

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ART UNIT	PAPER NUMBER
2614	
MAIL DATE	DELIVERY MODE
05/27/2008	PAPER

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/977,875
Filing Date: October 15, 2001
Appellant(s): ECKHOFF ET AL.

William D. Davis (38428)
For Appellant

EXAMINER'S ANSWER

The examiner submits a copy of the previously filed examiner's answer. At the end of the section titled '**(10) Response to Argument**', the examiner submits a response to appellants reply brief filed 3-17-2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US patents to Apfel (5,619,567), Ludeman (6,665,398), Ortel (6,157,716) and Zhou (5878133)

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1,2,13,** rejected under 35 U.S.C. 103(a) as being unpatentable over Apfel (5619567) and further in view of Ludeman (6665398).

As per **claim 1,** Apfel discloses a variable DC feed characteristic for a SLIC that switches from a normal mode 401 to a modified mode 402 DC feed (Fig. 4). The normal mode is switched to the modified mode when Vab is less than or equal to threshold B. The mode is switched back to the normal mode at threshold E. Apfel discloses that mode is switched (from either on-hook to off-hook or off-hook to on-hook) based upon a hook

switch threshold (points E and B in Fig. 4). However, Apfel does not disclose that the switching occurs occurs at two distinct loop currents (Apfel only has one switching threshold).

Ludeman discloses a SLIC that provides a 'threshold window' 100 (Fig. 4) that comprises two distinct switching points Ish- and Ish+ to begin the switching from onhook to offhook and from offhook to onhook. The points are set based upon a programmable threshold value (Col 5 lines 10-30). Ludeman discloses that prior art systems such as that shown in Fig. 2 rely on single switching thresholds are unstable around the transition point because of the speed of change (Col 2 lines 10-25), and teaches that his inventive system overcomes the drawbacks of the prior art (Col 2 lines 50-55). It would have been obvious to one of ordinary skill in the art at the time of this application to have two distinct switching points B and E in Fig. 4 of Apfel for the purpose of providing a longer, and more stable transition.

As per **claim 13,** it is rejected for the same reasons as the claim 1 rejection.

As per **claim 2,** curve 401 (APFEL: Fig. 4) is linear, defined by VBAT-Voff1, and has a slope corresponding to an impedance.

3. **Claims 3-5,14,16** rejected under 35 U.S.C. 103(a) as being unpatentable over Apfel (5619567) in view of Ludeman (6665398) as applied to claims 1,13.

As per **claims 3,14,16,** Apfel uses an open circuit voltage value (VBAT-Voff1), two relative thresholds (B,E), and a target voltage (VBAT-Voff3) to define linear portions 401,402. However Apfel does not specify using a target open circuit voltage in defining the load line.

Since the impedance (slope) of the modified characteristic (402 in Fig. 4) is the same as the unmodified characteristic 401, the line could be defined by any current/voltage point (open circuit or loaded) relative to VBAT-Voff1 and still obtain the same characteristic curve. It would have been obvious to one of ordinary skill in the art at the time of this application to define the characteristic 402 with any voltage/current relative to the characteristic 401 as a matter of design choice.

As per **claim 4,** claim rejected for same reasons as claims 2,3. The impedance (slope) of both curves is equal (Fig. 4).

As per **claim 5,** Apfel (Fig. 1b) discloses the impedance (slope) is 400 ohms (approximately 320 ohms).

4. **Claims 6-9,** rejected under 35 U.S.C. 103(a) as being unpatentable over Apfel (5619567) in view of Ludeman (6665398), and further in view of Zhou (5878133).

As per **claims 6,** Apfel and Ludeman disclose claim 6 for the same reasons as the rejection of claim 1. However, they do not disclose using programmable registers to hold the variables that define the characteristic curve.

Zhou teaches a Digital Direct Current Feed control for a SLIC that uses registers to store values that define a characteristic feed curve (Col 7 lines 10-55). It would have been obvious to one of ordinary skill in the art at the time of this application to digitally implement as much of the SLIC circuitry as possible for the advantage of providing a more easily manufactured product.

As per **claim 7,** Zhou discloses a DSP.

As per **claims 8,9,** claim rejected for same reasons as claim 2-4.

5. **Claims 10-12,15,** rejected under 35 U.S.C. 103(a) as being unpatentable over Apfel (5619567) in view of Ludeman (6665398) in view of Zhou (5878133) as applied to claims 6,9,13.

As per **claim 10,** Apfel in view of Ludeman in view of Zhou uses digital registers to store values used to define a characteristic curve. Apfel uses an open circuit voltage value (VBAT-Voff1), two relative thresholds (B,E), and a target voltage (VBAT-Voff3). However they do not specify using a target open circuit voltage in defining the load line.

Since the impedance (slope) of the modified characteristic (402 in Fig. 4) is the same as the unmodified characteristic 401, the line could be defined by any current/voltage point (open circuit or loaded) relative to VBAT-Voff1 and still obtain the same characteristic curve. It would have been obvious to one of ordinary skill in the art at the time of this

application to define the characteristic 402 with any voltage/current relative to the characteristic 401 as a matter of design choice.

As per **claim 11,** claim rejected for same reasons as claims 10. The impedance (slope) of both curves is equal (Fig. 4).

As per **claims 12,15,** Apfel (Fig. 1b) discloses the impedance (slope) is 400 ohms (approximately 320 ohms).

(10) Response to Argument

As per appellant's argument (brief page 6 bottom half to page 7 top half) that Apfel does not disclose two distinct voltage switching thresholds (only a single current switching threshold), the examiner disagrees. Apfel discloses point E and point B which are at different voltage thresholds. The only differences between appellant's Fig. 3 and Apfel's Fig. 4 are the lack of two distinct current thresholds and the fact that Apfel does not specifically label points E and B as 'threshold voltages'. Examiner notes that a current through the loop resistance will equal a metallic loop voltage (V=I*R). Apfel switches between a common current threshold, but the loop resistance will be different depending on whether the loop is switching from on-hook to off-hook or it is switching from off-hook to on-hook. As such the loop voltage (voltage threshold) will be different in each case. This is shown in Apfel's Fig. 4 as points E and B. Examiner additionally notes that Apfel even contemplates the relationship between the voltage and current in the loop (Col 3 lines 44-60).

As per appellant's arguments that Ludeman does not teach hysteresis and only teaches one characteristic curve (brief: page 7 bottom half), the examiner notes that Apfel teaches the two characteristic curves. Ludeman is relied upon to teach having two distinct current thresholds (Fig. 6) and provides a valid motivation to implement two distinct current thresholds (as noted in the original rejection above). Appellant states that the 'transition to' and 'transition from' point are the same, but that is incorrect. Ludeman Figure 6 shows two distinct transition points at Von (Ish-) and Voff (Ish+). Ludeman specifically states the advantage of not having the same current threshold (Col 2 lines 10-23). Examiner additionally notes US patent to Ortel which also discloses the well known concept of two separate current thresholds in a SLIC (Fig. 16).

As per appellant's arguments that Zhou does not teach hysteresis (brief: page 8), examiner notes that Zhou is relied on to teach the specifics of implementing a characteristic curve in a SLIC. Apfel and Ludeman teach the particular characteristic curve.

As per appellant's argument that Apfel and Zhou do not teach two distinct current thresholds (brief: page 9), examiner notes that Ludeman is relied upon to teach that.

Appellant has repeated his arguments regarding Ludeman (appeal brief page 10). Examiner offers the same response as noted above. Ludeman does teach two distinct current thresholds and a valid motivation to implement them.

As per appellant's argument that Ludeman and Apfel appear to teach away from each other (brief: page 12), examiner contends that the cited motivation in Ludeman to implement two distinct current thresholds is valid and that one skilled in the art could easily implement the distinct current thresholds into the curve of Apfel for the advantage state by Ludeman (transition stability).

As per appellant's argument that the combination is unworkable (brief: page 12), examiner contends that providing two distinct current thresholds would be obvious to one of skill in the art. Apfel discloses that a hook switch detector monitors the load current to determine the offhook condition (APFEL: Col 6 lines 40-45). Apfel discloses that any of a variety of off-hook detectors known in the art may be used. Apfel could use the off-hook detection disclosed by Ludeman which provides two distinct current thresholds that define the onhook and offhook conditions on the loop.

As per appellant's comments on the Ortel reference (brief page 14), the examiner notes that Ortel is only noted to show the well known concept of two distinct current thresholds in a SLIC (which is also taught by Ludeman). Examiner contends that the on-hook/off-hook detection of Ortel could be implemented as one of the 'variety of offhook detectors' that may be implemented in Apfel. Examiner notes that Apfel does not go into detail as to the specifics of the hook switch detect (Apfel: Fig. 5 block 533). As such, the examiner contends that this is even more motivation to look to other prior art systems (to find the specific hook switch detect implementation).

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As per appellant's argument (top of page 3) that the Hysteresis approach taught by Apfel is an alternate solution to the problems taught by Ludeman, the examiner notes that that Apfel discloses that his characteristic curve will provide enhanced stability. This is not the same

solution as taught by Ludeman's disclosure. Ludeman teaches to provide separate current thresholds to increase stability.

Providing stability with hysteresis is done by increasing the transition time between the onhook/offhook state. Apfel provides one way of doing this (providing the different voltage overheads). However, Apfel's primary objective is to reduce the power lost in the SLIC, while still providing the required voltage/current on the line for both offhook and onhook conditions. (Apfel Col 2 lines 25-65). Apfel does not optimize the stability of the system, he is trying to lower the power draw of the SLIC by using a characteristic curve with different overhead voltages supplying the SLIC for onhook and offhook. Ludeman teaches a way to additionally increase the transition time –without- varying the supply voltage overhead (varying supply voltage overheads will affect power loss on the SLIC): by having distinct switching thresholds. The examiner contends that Apfel's solution will not necessarily make a system completely 'stable'. Apfel discloses that the different overhead voltages happen to 'enhance stability', but Apfel is not designing the system to be completely stable, he is designing the system to lower the power lost in the SLIC. As such examiner maintains that it would have been obvious that other known means could be used to increase the transition time and further increase stability using the well known method taught by Ludeman.

As per appellant's arguments that examiner has not shown how exactly Apfel and Ludeman would be combined, the examiner contends that both Ludeman and Apfel disclose voltage feed characteristics graphs and disclose the circuitry to implement those characteristics. The examiner contends that one of skill in the art would know how to implement the characteristic of Apfel with the current detector with two distinct thresholds taught by Ludeman.

Examiner further notes that appellant has not shown any specific details in the submitted specification, including any code detailing how the specific algorithms will be implemented in a digital processing device, or any circuit level implementations that will actually provide the disclosed DC feed characteristic. The examiner contends one of skill in the art would know how to implement the DC feed graph in appellant's characteristic, as well the Apfel characteristic with the distinct current thresholds taught by Ludeman.

As per appellant's arguments concerning the transitioning of the signals (arguments pages 7-9), the examiner notes that the distinct current thresholds taught by Ludeman implemented in Apfel's system will give the same characteristic as claimed by appellant.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Alexander Jamal

/Alexander Jamal/

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